

What is Claimed is:

1. A recoil starter comprising:

a casing having a reel shaft formed on an inside thereof;

5 a rope reel rotatably mounted to said reel shaft and having a recoil rope wound therearound;

a spiral spring for rotationally urging said rope reel in a direction of winding said recoil rope;

10 a cam rotatably mounted to said reel shaft in a manner to face said rope reel;

a rotational member attached to a crankshaft of an engine and provided with a ratchet mechanism which disengageably engages with said cam; and

a damper spring in the form of a coil spring

15 disposed around outer peripheries of bosses which are formed on said rope reel and said cam, respectively, said damper spring having opposite ends held respectively on said rope reel and said cam, wherein a rotational force of said rope reel is transmitted to said cam via a resilience of said 20 damper spring and a rotation of said cam is then transmitted to said rotational member via said ratchet mechanism to thereby start the engine, wherein

said opposite ends of said damper spring are provided with respective engaging portions which are radially 25 movably supported by holding portions on said rope reel and said cam, respectively, so that when said damper spring is resiliently deformed by a startup resistance of the engine, substantially the overall length of a coiled portion of said damper spring winds and tightens uniformly around the outer 30 peripheral surfaces of both of said bosses formed on said rope reel and said cam, respectively.

2. The recoil starter according to claim 1, wherein said bosses are extended from and integrally formed on said rope reel and said cam, respectively, and include respective

end faces which are butted against each other substantially at the middle of said coiled portion of said damper spring.

3. The recoil starter according to claim 1, wherein
said cam is rotatably supported at two locations, one of the
5 locations being a center support portion defined by an end
face of said reel shaft and the other being an outer
peripheral support portion defined by an outer peripheral
surface of a flange portion which is radially outwardly
protruded and integrally formed on said cam so as to engage
10 with the side surface of said rope reel.

4. The recoil starter according to claim 2, wherein
said cam is rotatably supported at two locations, one of the
locations being a center support portion defined by an end
face of said reel shaft and the other being an outer
15 peripheral support portion defined by an outer peripheral
surface of a flange portion which is radially outwardly
protruded and integrally formed on said cam so as to engage
with the side surface of said rope reel.

5. The recoil starter according to claim 1, wherein
20 said rope reel and said cam are provided on joining surfaces
thereof with respective annular recesses which are formed to
face each other so as to receive said damper spring therein,
said rope reel and said cam being coupled together via said
damper spring; and

25 said cam includes an outer peripheral wall which
forms said annular recess thereof and on which a plurality of
openings are formed circumferentially apart so that portions
of said outer peripheral wall between the adjacent openings
each define a cam pawl which is engageable with said ratchet
30 mechanism.

6. The recoil starter according to claim 2, wherein
said rope reel and said cam are provided on joining surfaces
thereof with respective annular recesses which are formed to
face each other so as to receive said damper spring therein,

said rope reel and said cam being coupled together via said damper spring; and

5 said cam includes an outer peripheral wall which forms said annular recess thereof and on which a plurality of openings are formed circumferentially apart so that portions of said outer peripheral wall between the adjacent openings each define a cam pawl which is engageable with said ratchet mechanism.

10 7. The recoil starter according to claim 3, wherein said rope reel and said cam are provided on joining surfaces thereof with respective annular recesses which are formed to face each other so as to receive said damper spring therein, said rope reel and said cam being coupled together via said damper spring; and

15 15 said cam includes an outer peripheral wall which forms said annular recess thereof and on which a plurality of openings are formed circumferentially apart so that portions of said outer peripheral wall between the adjacent openings each define a cam pawl which is engageable with said ratchet mechanism.

20 25 8. The recoil starter according to claim 4, wherein said rope reel and said cam are provided on joining surfaces thereof with respective annular recesses which are formed to face each other so as to receive said damper spring therein, said rope reel and said cam being coupled together via said damper spring; and

30 30 said cam includes an outer peripheral wall which forms said annular recess thereof and on which a plurality of openings are formed circumferentially apart so that portions of said outer peripheral wall between the adjacent openings each define a cam pawl which is engageable with said ratchet mechanism.

9. The recoil starter according to claim 5, wherein said outer peripheral wall of said cam forming said annular

recess thereof is provided on one side thereof with a flange portion which is radially outwardly extended and integrally formed on said outer peripheral wall, and wherein each of said cam pawls has opposite ends thereof connected to and supported by an inner peripheral rim of said flange portion and a bottom of said annular recess of said cam, respectively.

10. The recoil starter according to claim 6, wherein said outer peripheral wall of said cam forming said annular recess thereof is provided on one side thereof with a flange portion which is radially outwardly extended and integrally formed on said outer peripheral wall, and wherein each of said cam pawls has opposite ends thereof connected to and supported by an inner peripheral rim of said flange portion and a bottom of said annular recess of said cam, respectively.

15. The recoil starter according to claim 7, wherein said outer peripheral wall of said cam forming said annular recess thereof is provided on one side thereof with a flange portion which is radially outwardly extended and integrally formed on said outer peripheral wall, and wherein each of said cam pawls has opposite ends thereof connected to and supported by an inner peripheral rim of said flange portion and a bottom of said annular recess of said cam, respectively.

20. The recoil starter according to claim 8, wherein said outer peripheral wall of said cam forming said annular recess thereof is provided on one side thereof with a flange portion which is radially outwardly extended and integrally formed on said outer peripheral wall, and wherein each of said cam pawls has opposite ends thereof connected to and supported by an inner peripheral rim of said flange portion and a bottom of said annular recess of said cam, respectively.

25. A recoil starter comprising:

a casing having a reel shaft formed on an inside thereof;

30. a rope reel rotatably mounted to said reel shaft and

having a recoil rope wound therearound;

a spiral spring for rotationally urging said rope reel in a direction of winding said recoil rope;

5 a cam rotatably mounted to said reel shaft in a manner to face said rope reel;

a rotational member attached to a crankshaft of an engine and provided with a ratchet mechanism which disengageably engages with said cam; and

10 a damper spring interposed between said rope reel and said cam, wherein a rotational force of said rope reel is transmitted to said cam via a resilience of said damper spring and a rotation of said cam is then transmitted to said rotational member via said ratchet mechanism to thereby start the engine, wherein

15 said rope reel and said cam are provided on joining surfaces thereof with respective annular recesses which are formed to face each other so as to receive said damper spring therein, said damper spring having opposite ends thereof held respectively onto said rope reel and said cam so that said 20 rope reel and said cam are coupled together via said damper spring; and

25 said cam includes an outer peripheral wall which forms said annular recess thereof and on which a plurality of openings are formed circumferentially apart so that portions of said outer peripheral wall between the adjacent openings each define a cam pawl which is engageable with said ratchet mechanism.

14. The recoil starter according to claim 13, wherein said outer peripheral wall of said cam forming said 30 annular recess thereof is provided on one side thereof with a flange portion which is radially outwardly extended and integrally formed on said outer peripheral wall, and wherein each of said cam pawls has opposite ends thereof connected to and supported by an inner peripheral rim of said flange

portion and a bottom of said annular recess of said cam, respectively.

15. The recoil starter according to claim 13, wherein said cam is rotatably supported at two locations, one of the locations being a center support portion defined by an end face of said reel shaft and the other being an outer peripheral support portion defined by an outer peripheral surface of a flange portion which is radially outwardly protruded and integrally formed on said cam so as to engage 10 with the side surface of said rope reel.

16. The recoil starter according to claim 14, wherein said cam is rotatably supported at two locations, one of the locations being a center support portion defined by an end face of said reel shaft and the other being an outer 15 peripheral support portion defined by an outer peripheral surface of said flange portion which engages with the side surface of said rope reel.